October 1972 B72-10653

NASA TECH BRIEF

NASA Headquarters

A Process Yields Large Quantities of Pure Ribosome Subunits

The problem:

Ribosome subunits which are used in the study of their properties or for in-vitro protein synthesis are obtained by isolation of ribosomes from the living cells followed by dissociation of these ribosomes into subunits by either dialysis or with chelating agents. This process is inefficient because it yields a large quantity of impure subunits, or the so called "derived" subunits, which contain partially completed proteins that were being synthesized when the cell was broken. The yield of "native" subunits or the subunits which are about to initiate a new round of protein synthesis is unfortunately very small.

The solution:

A new process was developed which improves the yield of "native" subunits to 90%. This process was applied to E. coli.

How it's done:

Before the cells are broken, they are cooled to below the critical temperature so that ribosomes continue protein synthesis but cannot reinitiate a new cycle. The result is a large accumulation of "native" subunits which are then isolated in the conventional way without disassembly of the ribosome itself.

The advantages of the presented method are: 1) a lengthy or expensive step in the preparation is omitted; 2) the subunits are free of contaminating partially-completed protein; 3) the product is in its naturally active form; 4) the product is obtained in high yield; and 5) the method is not restricted to particular mutants but can be applied to all cells.

Note:

Requests for further information may be directed to:

Technology Utilization Officer
NASA Headquarters
Code KT
Washington, D.C. 20546
Reference: B72-10653

Patent status:

NASA has decided not to apply for a patent.

Source: M. Friedman, P. Lu, and
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under contract to
NASA Headquarters
(HQN-10662)

Category 05